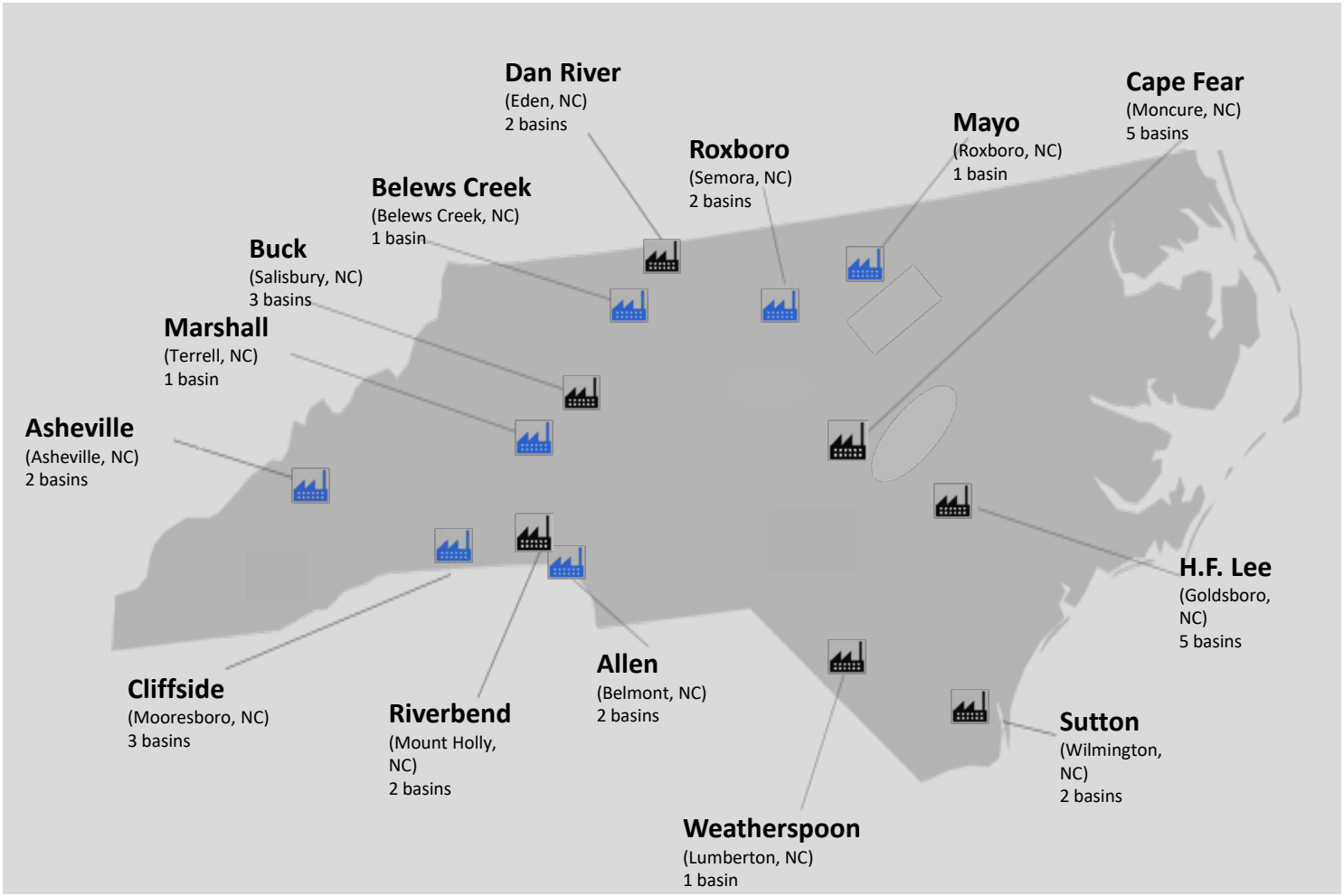
Duke Energy South Carolina Sites and Number of Ash Basins

Duke Energy North Carolina Sites and Number of Ash Basins



Site Facts - DEC

Site	Commercial Operation Date	Generation Capacity (MW)	Retirement Date, if applicable	Possible closure approach	Quantity of ash on site in basins at 7/31/18 (in million tons)	Is a CCR landfill envisioned for the site?
Allen	1957	1127	n/a	Cap in Place	16.6MT	No
Belews Creek	1974	2220	n/a	Cap in Place	12.0MT	No
Buck	1926	370	U3&4 -2011 U5&6 2013	Beneficiation	6.5MT	No
Cliffside 5	1972	1396	n/a	Cap in Place	7.4MT	No
Cliffside 1-4	1940	210	2011	Onsite landfill	0	Yes
Dan River	1949	290	2012	Offsite excavation/onsite landfill	1.1MT	Yes
Marshall	1965	2078	n/a	Cap in Place	16.8MT	No
Riverbend	1929	466	2013	Offsite excavation	.05MT	No
WS Lee	1951	200	2014	Onsite landfill	2.2MT	Yes

Note: quantities represent basin ash only and do not include fill or landfill ash quantities

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DEC					
Ash Basin Information					
Site	**Basin**	**When constructed**	**Ash in Tons as of 7/31/18 (Millions)**	**When closed if applicable**	**CCR Applicable?**
DEC					
Allen	Retired basin	1957	10.4	1973	Y
	Active Basin	1972	6.2	n/a	Y
Belews Creek	Active basin	1974	12	n/a	Y
Buck	Basin #1	1956	3.6	2013	Y
	Basin #2	1977	2	2013	Y
	Basin #3	1982	0.9	2013	Y
Cliffside	U1-4 inactive basin	1957	0	1977	Y
	U5 inactive basin	1970	2.4	1980	Y
	Active basin	1980	5	n/a	Y
Dan River	Primary basin	1956	0.7	2012	Y
	Secondary basin	1977	0.4	2012	Y
Marshall	Active basin	1965	16.8	n/a	Y
Riverbend	Primary and secondary basins	1957/1957	0.05	2014/2014	N/N
WS Lee	Primary basin	1974	2.2	2014	Y
	Secondary basin	1978	0.03	2014	Y
	1951/1959 inactive basin	1951	0	1974	N

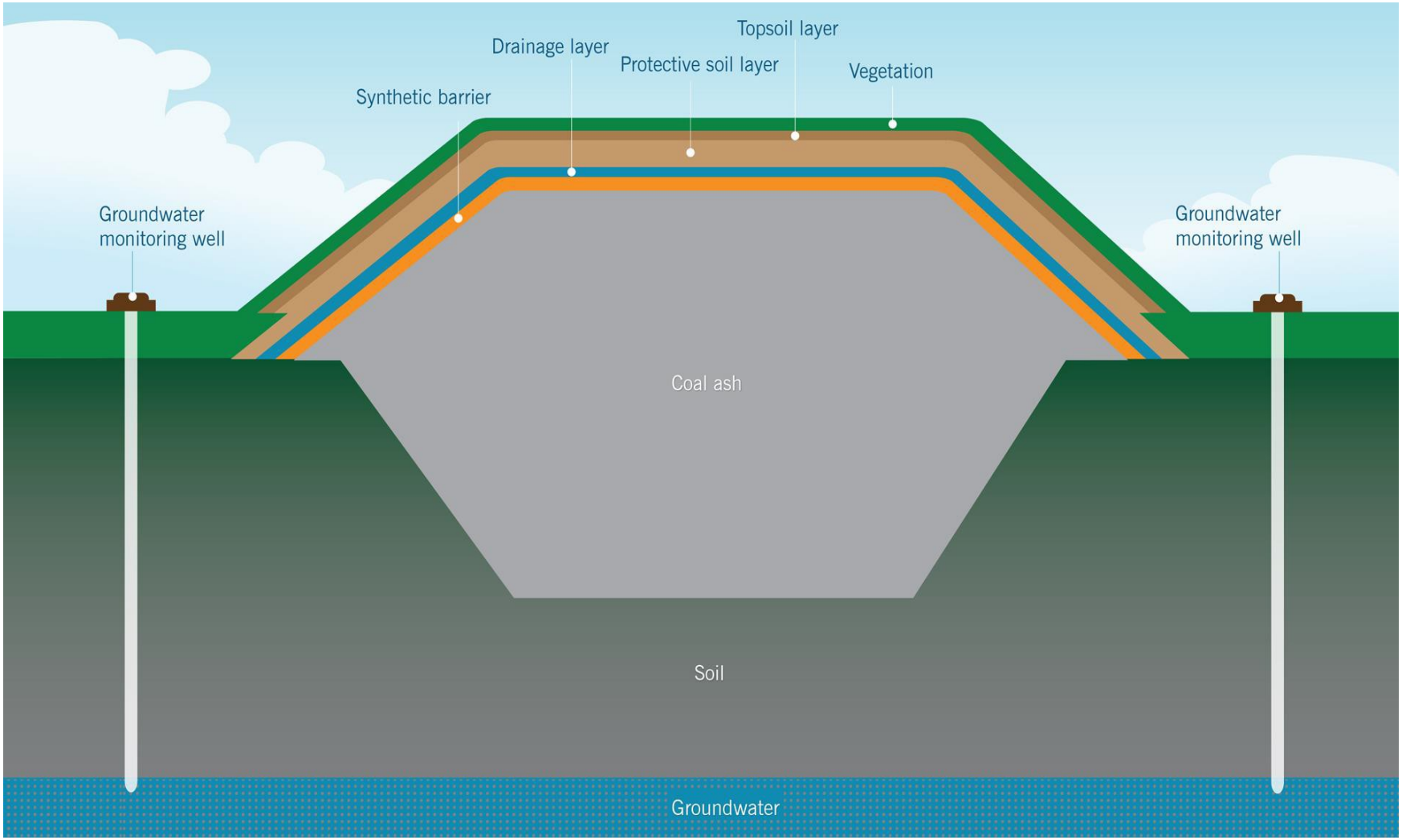
Duke Energy Carolinas
Responses to Rule Changes Through the Decades

	1940s	1950s	1960s	1970s	1980s	1990s	2000s
Industry Standard	Fly ash discharged through smoke stacks. Bottom ash placed in landfills.	Fly ash discharged through smoke stacks. Water sluicing to ash basins for bottom ash.	Fly ash discharged through smoke stacks. Water sluicing to ash basins for bottom ash.	Fly ash discharged through smoke stacks. Water sluicing to ash basins for bottom ash.	Fly ash contained by ESPs. Water sluicing to ash basins for fly and bottom ash.	Fly ash contained by ESPs. Water sluicing to ash basins for fly and bottom ash. Water sluicing to ash basins for FGD byproducts	Fly ash contained by ESPs. Water sluicing to ash basins for fly and bottom ash. Water sluicing to ash basins for FGD
DEC Coal Plants	Buck Cliffside Dan River	Buck Cliffside Dan River Allen Riverbend WS Lee	Buck Cliffside Dan River Allen Riverbend WS Lee Marshall	Buck Cliffside Dan River Allen Riverbend WS Lee Marshall Belews Creek	Buck Cliffside Dan River Allen Riverbend WS Lee Marshall Belews Creek	Buck Cliffside Dan River Allen Riverbend WS Lee Marshall Belews Creek	Cliffside (U5 only) Allen Marshall Belews Creek
DEC Ash Basins	None	Buck Cliffside Dan River Allen Riverbend WS Lee	Buck Cliffside Dan River Allen Riverbend WS Lee Marshall	Buck Cliffside Dan River Allen Riverbend WS Lee Marshall Belews Creek	Buck Cliffside Dan River Allen Riverbend WS Lee Marshall Belews Creek	Buck Cliffside Dan River Allen Riverbend WS Lee Marshall Belews Creek	Buck Cliffside Dan River Allen Riverbend WS Lee Marshall Belews Creek
Law Changes	None	None	None	Clean Air Act Clean Water Act	Clean Air Act	None	CCR/CAMA
Industry Standard Changes	Water sluicing to ash basins	None	None	ESPs deployed on coal plants. NPDES/ELG permits and guidelines	FGD/Scrubbers to control sulfur emissions	None	Dry CCR handling or plant closure. Excavation and removal or cap in place for basins.
Plant and/or Basin Modifications	Water sluicing deployed to coal plants. Ash basins begin to be built	None	None	ESP's added to plants. Basin use conformed to NPDES/ELG permits and guidelines.	FGD/Scrubbers to some plants	FGD/Scrubbers to some plants	Dry CCR handling or plant closure. Excavation and removal or cap in place for basins.

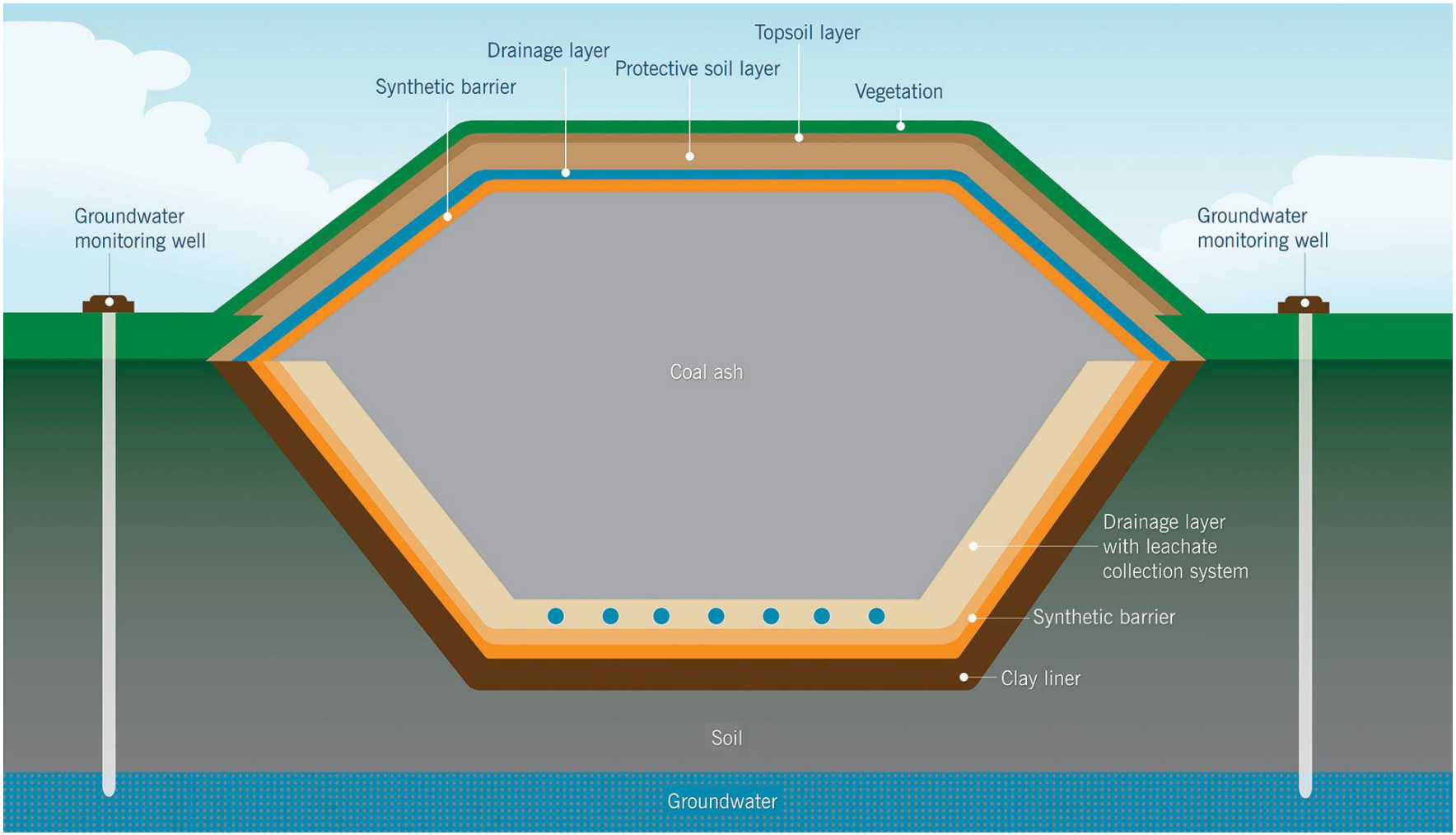
Duke Energy Corporation
Summary of Ash Beneficiation for Duke Energy Carolinas
2015 , 2016, 2017 and 2018 January to August

2015	DEC
Ash Produced	973,264
Production Ash Reused	375,934
Ash Sluiced	135,912
Ash Landfilled	781,320
Ash to Structural Fill	-
Reclaimed Ash for Beneficial Reuse	-
2016	**DEC**
Ash Produced	945,854
Production Ash Reused	362,050
Ash Sluiced	156,584
Ash Landfilled	748,803
Ash to Structural Fill	20,997
Reclaimed Ash for Beneficial Reuse	-
2017	**DEC**
Ash Produced	895,849
Production Ash Reused	346,900
Ash Sluiced	96,081
Ash Landfilled	720,772
Ash to Structural Fill	-
Reclaimed Ash for Beneficial Reuse	-
2018	**DEC**
Ash Produced	545,238
Production Ash Reused	194,465
Ash Sluiced	38,866
Ash Landfilled	550,685
Ash to Structural Fill	2,927
Reclaimed Ash for Beneficial Reuse	-

Closure options: engineered capping system



Closure options: fully lined landfill



Duke Energy Carolinas				Docket No. 2018-319-E
Breakdown of 2015-August 31, 2018 Compliance Spend by site				
All numbers presented on a system basis				
Site	**2015 - August 31,2018 compliance spend**	**Type of spend**	**Legal justification for spend**	**Spend justification**
Allen	$ 53,059,021	Ash closure development engineering; closure design drawings; wetland delineation; interstitial water and landfill leachate work; CAMA wells; alternate spillway; dam stability; groundwater; planning and overheads.	40 CFR 257.102(b) 40 CFR 257.60 40 CFR 257.101(b)(1) CAMA §§ 130A-309.213 and .214 HB 630 § 130A-309.211(c1)	Allen is subject to CCR rule provisions requiring basin closure. 40 CFR § 257.102(b) required a written closure plan by October 17, 2016. On October 11, 2018, it was determined that both ash basins at the Allen plant did not meet the uppermost aquifer location restriction (40 CFR § 257.60). This results in the Allen station basins being required to commence closure pursuant to 40 CFR § 257.101(b)(1)(i) no later than October 31, 2020. The Allen plant is anticipating a low-risk ranking under CAMA in light of Duke Energy's completion of the dam safety activities required under NCGS § 130A-309.213(d)(1)b. and establishment of the permanent water supplies required under NCGS §§ 130A-309.211(c1) and 130A-309.213(d)(1)a. Engineering and project planning at the current time are needed to synchronize work between all of the coal ash sites being closed in the next 20 years, as well as to gain synergies between excavation/capping plans for all the sites. Closure plan preparation and submission is required by CAMA.
Belews Creek	$ 50,535,423	Closure engineering; planning and overheads; CAMA and CCR wells; dam stability; groundwater activities.	40 CFR 257.102(b) 40 CFR 257.60 40 CFR 257.61 40 CFR 257.101(b)(1) CAMA §§ 130A-309.213 and .214 HB 630 § 130A-309.211(c1)	Belews Creek is subject to CCR rule provisions requiring basin closure. 40 CFR § 257.102(b) required a written closure plan by October 17, 2016. On October 12, 2017, it was determined that the ash basin at the Belews Creek plant did not meet the wetlands location restriction (40 CFR § 257.61) and the uppermost aquifer location restriction (40 CFR § 257.60). This results in the Belews Creek ash basin being required to commence closure pursuant to 40 CFR § 257.101(b)(1) on April 12, 2019. The Belews Creek plant is anticipating a low-risk ranking under CAMA in light of Duke Energy's completion of the dam safety activities required under NCGS § 130A-309.213(d)(1)b. and establishment of the permanent water supplies required under NCGS §§ 130A-309.211(c1) and 130A-309.213(d)(1)a. Engineering and project planning at the current time are needed to synchronize work between all of the coal ash sites being closed in the next 20 years, as well as to gain synergies between excavation/capping plans for all the sites. Closure plan preparation and submission is required by CAMA.

Duke Energy Carolinas				Docket No. 2018-319-E
Breakdown of 2015-August 31, 2018 Compliance Spend by site				
All numbers presented on a system basis				
Site	**2015 - August 31,2018 compliance spend**	**Type of spend**	**Legal justification for spend**	**Spend justification**
Buck	$ 80,765,334	Closure plan development; wetlands delineation; dewatering; planning and overheads; CCR and CAMA wells; alternate spillway; beneficiation facility; groundwater; SW/PW reroute	40 CFR 257.102(b) 40 CFR 257.60 40 CFR 257.61 40 CFR 257.101(b) CAMA § 130A-309.213 and .214 HB630 §§ 130A-309.216	Buck is subject to CCR rule provisions requiring basin closure. 40 CFR § 257.102(b) required a written closure plan by October 17, 2016. On October 15, 2018, it was determined that the Additional Primary Pond and the Secondary Pond at Buck did not meet the wetlands location restriction (40 CFR § 257.61) and the uppermost aquifer location restriction (40 CFR § 257.60). This results in the additional primary pond and the secondary pond at Buck being required to commence closure pursuant to 40 CFR § 257.101(b)(1) on April 15, 2019. On October 15, 2018, it was also determined that the primary pond at Buck did not meet the uppermost aquifer location restriction (40 CFR § 257.60). This results in the Primary Pond at Buck being required to commence closure pursuant to 40 CFR § 257.101(b)(1)(i) no later than October 31, 2020. NC House Bill 630 mandated that three sites be identified for ash beneficiation (NCGS § 130A-309-216). Buck was chosen as one of those sites.
Cliffside	$ 66,076,839	Ash excavation and transport (Inactive ash basin); landfill activities to support excavation; planning and overheads; closure engineering; CAMA and CCR wells; alternate spillway; landfill; groundwater	40 CFR 257.102(b) 40 CFR 257.60 40 CFR 257.61 40 CFR 257.101(b)(1) CAMA §§ 130A-309.213 and .214 HB 630 § 130A-309.211(c1)	Cliffside is subject to CCR rule provisions regarding basin closure. 40 CFR § 257.102(b) required a written closure plan by October 17, 2016. On October 11, 2018, it was determined that the Active Ash Basin and the Inactive Unit 5 Basin at Cliffside did not meet the wetlands location restriction (40 CFR § 257.61) and the uppermost aquifer location restriction (40 CFR § 257.60). This results in the Active Ash Basin and the Inactive Unit 5 Basin at Cliffside being required to commence closure pursuant to 40 CFR § 257.101(b)(1) on April 11, 2019. On November 3, 2016, the placement of wastestreams in the Inactive Units 1-4 Ash Basin ceased and closure of the basin commenced pursuant to 40 CFR § 257.102(e)(1)(i). The Cliffside plant is anticipating a low-risk ranking under CAMA in light of Duke Energy's completion of the dam safety activities required under NCGS § 130A-309.213(d)(1)b. and establishment of the permanent water supplies required under NCGS §§ 130A-309.211(c1) and 130A-309.213(d)(1)a. Engineering and project planning at the current time are needed to synchronize work between all of the coal ash sites being closed in the next 20 years, as well as to gain synergies between excavation/capping plans for all the sites. Closure plan preparation and submission is required by CAMA.

Duke Energy Carolinas				Docket No. 2018-319-E
Breakdown of 2015-August 31, 2018 Compliance Spend by site				
All numbers presented on a system basis				
Site	**2015 - August 31,2018 compliance spend**	**Type of spend**	**Legal justification for spend**	**Spend justification**
Dan River	$ 167,426,449	Ash excavation and transportation; purchase of land rights; dewatering; landfill; stormwater diversion; leachate removal; permits; planning and overheads; landfill development; closure plan; CAMA wells; dam stability; wastewater treatment; groundwater	40 CFR 257.102(b) 40 CFR 257.60 40 CFR 257.101(b)(1) 40 CFR 257.102(e)(1) CAMA §§ 3.(b) and 3.(c) Order Granting Motion for Partial Summary Judgment dated June 1, 2016 (No. 13-CVS-4061)	Dan River is subject to CCR rule provisions regarding basin closure. 40 CFR § 257.101(b) required a written closure plan by October 17, 2016. On October 11, 2018, it was determined that the Secondary Ash Basin at Dan River did not meet the uppermost aquifer location restriction (40 CFR § 257.60). This results in the basin being required to commence closure pursuant to 40 CFR § 257.101(b)(1)(i) no later than October 31, 2020. The last volume of CCR for beneficial use was removed from the Dan River Primary Ash Basin on April 4, 2018, and, within 30 days, the basin commenced closure pursuant to 40 CFR § 257.102(e)(1)(ii). Pursuant to ¶ 5.e. of the Order Granting Motion for Partial Summary Judgment dated June 1, 2016 (No. 13-CVS-4061), a written Site Analysis and Removal Plan was due by December 31, 2016. Sections 3.(b) and 3.(c) of CAMA require excavation of the Dan River basins, with the ash disposed of in either an off-site or on-site landfill. (Dan River is a high-priority site, with ash basin closure required by August 1 2019.)
Marshall	$ 43,212,613	Closure plan development; wetlands delineation report; CAMA wells; landfill activities; alternate spillway; dam stability; groundwater; planning and overheads.	40 CFR 257.102(b) 40 CFR 257.60 40 CFR 257.61 40 CFR 257.101(b)(1) CAMA §§ 130A-309.213 and .214 HB 630 § 130A-309.211(c1)	Marshall is subject to CCR rule provisions regarding basin closure. 40 CFR § 257.102(b) required a written closure plan by October 17, 2016. On October 12, 2018, it was determined that the ash basin at Marshall did not meet the wetlands location restriction (40 CFR § 257.61) and the uppermost aquifer location restriction (40 CFR § 257.60). This results in the Marshall ash basin being required to commence closure pursuant to 40 CFR § 257.101(b)(1) on April 12, 2019. The Marshall plant is anticipating a low-risk ranking under CAMA in light of Duke Energy's completion of the dam safety activities required under NCGS § 130A-309.213(d)(1)b. and establishment of the permanent water supplies required under NCGS §§ 130A-309.211(c1) and 130A-309.213(d)(1)a. Engineering and project planning at the current time are needed to synchronize work between all of the coal ash sites being closed in the next 20 years, as well as to gain synergies between excavation/capping plans for all the sites. Closure plan preparation and submission is required by CAMA.

Duke Energy Carolinas				Docket No. 2018-319-E
Breakdown of 2015-August 31, 2018 Compliance Spend by site				
All numbers presented on a system basis				
Site	**2015 - August 31,2018 compliance spend**	**Type of spend**	**Legal justification for spend**	**Spend justification**
Riverbend	$ 316,680,565	Contractor mobilization; Brickhaven site preparation; Riverbend site preparation; excavation of CCR; transportation of CCR to Marshall, R&B Landfill, and Brickhaven; soil handling; interstitial water treatment equipment; engineering technical support; CAMA wells and groundwater	CAMA §§ 3.(b) and 3.(c) Order Granting Motion for Partial Summary Judgment dated June 1, 2016 (13-CVS-9352)	Riverbend is not currently subject to CCR rule provisions regarding basin closure. However, in response to the United States Court of Appeals for the District of Columbia Circuit's August 21, 2018 decision in *USWAG v. EPA* (No. 15-1219), EPA is expected to undertake a rulemaking that would regulate inactive impoundments at closed power plants, including the Riverbend basins. Pursuant to ¶ 5.e. of the Order Granting Motion for Partial Summary Judgment dated June 1, 2016 (13-CVS-9352), a written Site Analysis and Removal Plan was due by December 31, 2016. Sections 3.(b) and 3.(c) of CAMA require excavation of the Riverbend basins, with the ash disposed of in either an off-site or on-site landfill. (Riverbend is a high-priority site, with ash basin closure required by August 1 2019.)
W.S. Lee	$ 98,449,950	Contractor mobilization; readiness reviews; closure, drainage and road improvements; water treatment system; dewatering operations; ash removal; closure engineering; planning and overheads	40 CFR 257.102(b) 40 CFR 257.60 40 CFR 257.61 40 CFR 257.101(b)(1) Consent Agreement dated Sept. 29, 2014 (14-13-HW)	W.S. Lee is subject to CCR rule provisions regarding basin closure. 40 § CFR 257.102(b) required a written closure plan by October 17, 2016. On October 11, 2018, it was determined that the Secondary Ash Basin at W.S. Lee did not meet the wetlands location restriction (40 CFR § 257.61) and the uppermost aquifer location restriction (40 CFR. § 257.60). This results in the Secondary Ash Basin at W.S. Lee being required to commence closure pursuant to 40 CFR § 257.101(b)(1) on April 11, 2019. On October 11, 2018, it was determined that the Primary Ash Basin at W.S. Lee did not meet the uppermost aquifer location restriction (40 CFR § 257.60). This results in the Primary Ash Basin at W.S. Lee being required to commence closure pursuant to 40 CFR § 257.101(b)(1) no later than October 31, 2020. Under a Consent Agreement (14-13-HW) executed between the South Carolina Department of Health and Environmental Control and Duke Energy Carolinas on Sept. 29, 2014), W.S. Lee ash basins must be excavated.
Total - All Sites	**$ 876,206,194**			

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Note:				
After the entry of summary judgment the HB630 amendments to CAMA codified this requirement. Session Law 2016-95, Section 3(a) and (b) (excerpted below). See references below in HB630 supporting the decision to				
SECTION 3.(a) Notwithstanding G.S. 130A-309.213 or G.S. 130A-309.214, as amended by Section 1 of this act, and except as otherwise preempted by the requirements of federal law, the following coal combustion				
(1) Coal combustion residuals surface impoundments located at the H.F. Lee Steam Station, owned and operated by Duke Energy Progress, and located in Wayne County.				
(2) Coal combustion residuals surface impoundments located at the Cape Fear Steam Station, owned and operated by Duke Energy Progress, and located in Chatham County.				
(3) Coal combustion residuals surface impoundments located at the Weatherspoon Steam Station, owned and operated by Duke Energy Progress, and located in New Hanover County.				
SECTION 3.(b) The impoundments identified in subsection (a) of this section shall be closed as follows:				
(1) Impoundments located in whole above the seasonal high groundwater table shall be dewatered. Impoundments located in whole or in part beneath the				
seasonal high groundwater table shall be dewatered to the maximum extent practicable.				
(2) All coal combustion residuals shall be removed from the impoundments and transferred for (i) disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill or (ii) use in a structural fill				
(3) If restoration of groundwater quality is degraded as a result of the impoundment, corrective action to restore groundwater quality shall be implemented by the owner or operator as provided in G.S. 130A-309.211.				